

General Description

The WSP4088 is the highest performance trench N-Ch MOSFET with extreme high cell density, which provide excellent $R_{DS(on)}$ and gate charge for most of the synchronous buck converter applications.

The WSP4088 meet the RoHS and Green Product requirement 100% EAS guaranteed with full function reliability approved.

Features

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- 100% EAS Guaranteed
- Green Device Available

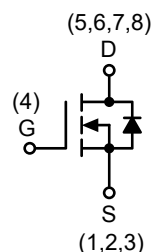
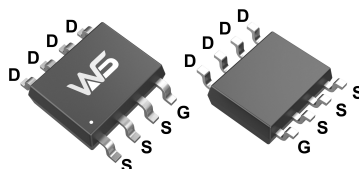
Product Summary

BV_{DSS}	$R_{DS(on)}$	I_D
40V	10.5m Ω	11A

Applications

- Power Management in Desktop Computer or DC/DC Converters.

SOP-8L Pin Configuration



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		40	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	
I _S	Diode Continuous Forward Current	T _A =25°C	2	A
I _D	Continuous Drain Current	T _A =25°C	11	A
		T _A =70°C	8.4	
I _{DM} ^a	Pulsed Drain Current	T _A =25°C	30	W
P _D	Maximum Power Dissipation	T _A =25°C	2.08	
		T _A =70°C	1.3	
R _{θJA}	Thermal Resistance-Junction to Ambient	t ≤ 10s	30	°C/W
		Steady State	60	
R _{θJL}	Thermal Resistance-Junction to Lead	Steady State	20	
I _{AS} ^b	Avalanche Current, Single pulse	L=0.1mH	23	A
E _{AS} ^b	Avalanche Energy, Single pulse	L=0.1mH	26	mJ

Note a : Max. current is limited by bonding wire.

Note b : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_J = 25^\circ\text{C}$).

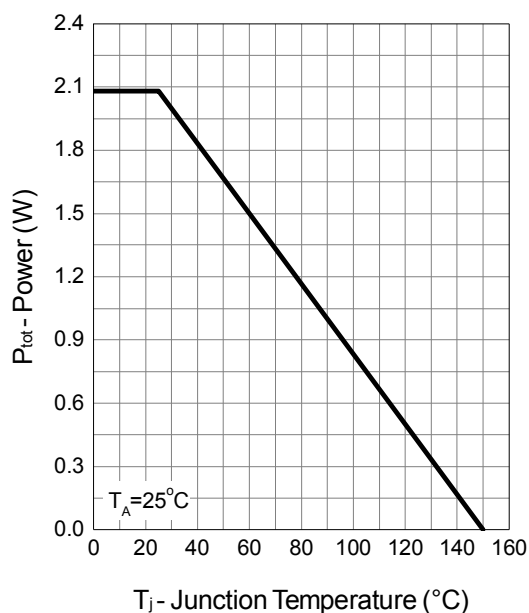
Electrical Characteristics (T_A = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =32V, V _{GS} =0V T _J =85°C	- -	- -	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	1.5	1.8	2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^c	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =7A T _J =125°C	- -	10.5 15.75	13 -	mΩ
		V _{GS} =4.5V, I _{DS} =5A	-	12	16	
Gfs	Forward Transconductance	V _{DS} =5V, I _{DS} =15A	-	31	-	S
Diode Characteristics						
V _{SD} ^c	Diode Forward Voltage	I _{SD} =10A, V _{GS} =0V	-	0.9	1.1	V
t _{rr}	Reverse Recovery Time	V _{DD} =20V, I _{SD} =10A, dI _{SD} /dt=100A/μs	-	15.2	-	ns
t _a	Charge Time		-	9.4	-	
t _b	Discharge Time		-	5.8	-	
Q _{rr}	Reverse Recovery Charge		-	9.5	-	nC
Dynamic Characteristics ^d						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	0.7	1.1	1.8	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =20V, Frequency=1.0MHz	-	1125	-	pF
C _{oss}	Output Capacitance		-	132	-	
C _{rss}	Reverse Transfer Capacitance		-	70	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, R _L =20Ω, I _{DS} =1A, V _{GEN} =10V, R _G =1Ω	-	10	-	ns
t _r	Turn-on Rise Time		-	12.6	-	
t _{d(OFF)}	Turn-off Delay Time		-	6	-	
t _f	Turn-off Fall Time		-	23.6	-	
Gate Charge Characteristics ^d						
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =4.5V, I _{DS} =7A	-	9.4	-	nC
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =10V, I _{DS} =7A	-	20	28	
Q _{gth}	Threshold Gate Charge		-	2	-	
Q _{gs}	Gate-Source Charge		-	3.9	-	
Q _{gd}	Gate-Drain Charge		-	3	-	

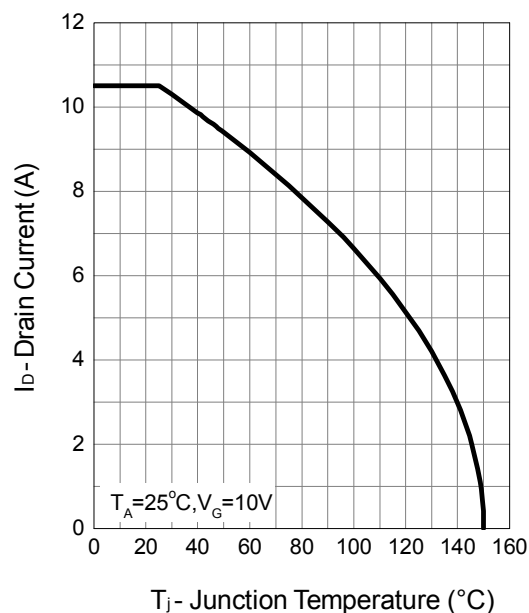
Note c : Pulse test ; pulse width≤300μs, duty cycle≤2%.

Typical Operating Characteristics

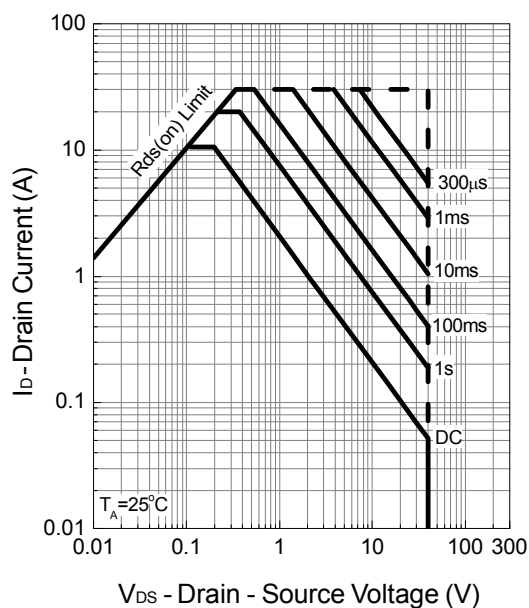
Power Dissipation



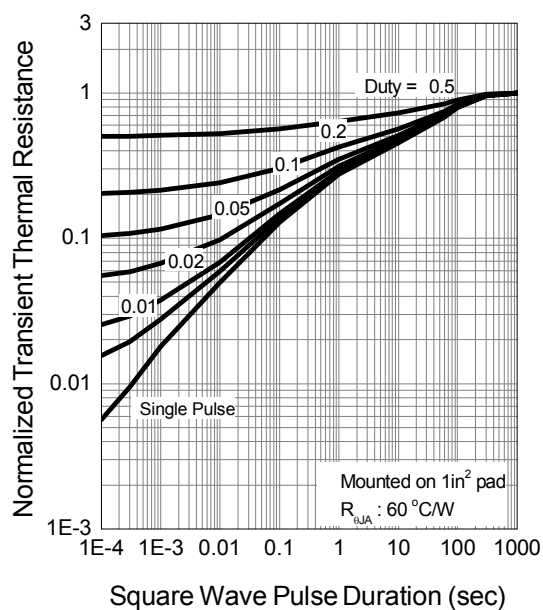
Drain Current



Safe Operation Area

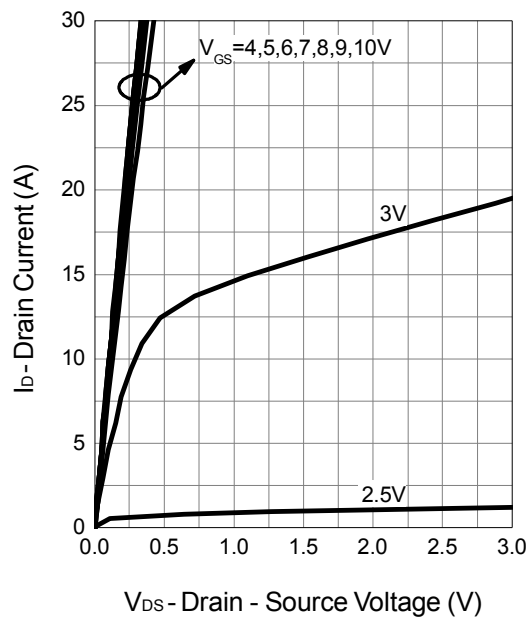


Thermal Transient Impedance

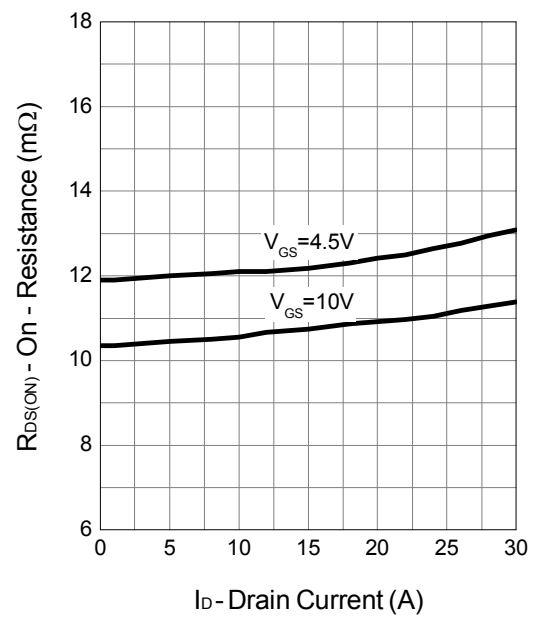


Typical Operating Characteristics (Cont.)

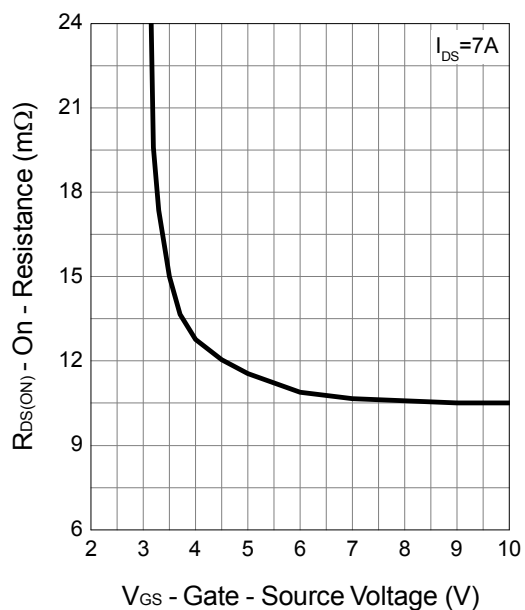
Output Characteristics



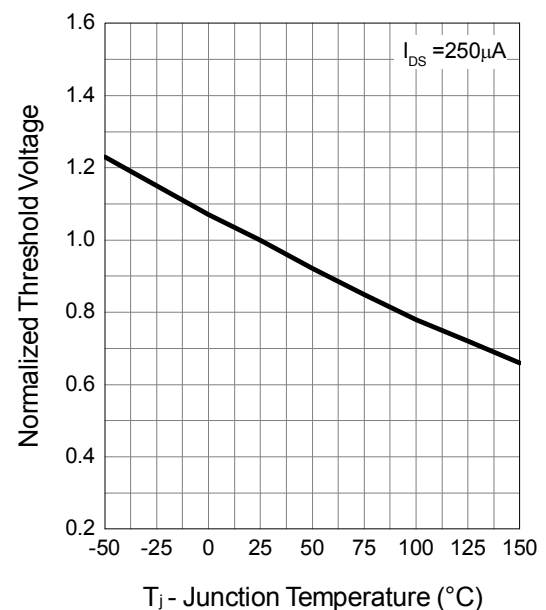
Drain-Source On Resistance



Gate-Source On Resistance

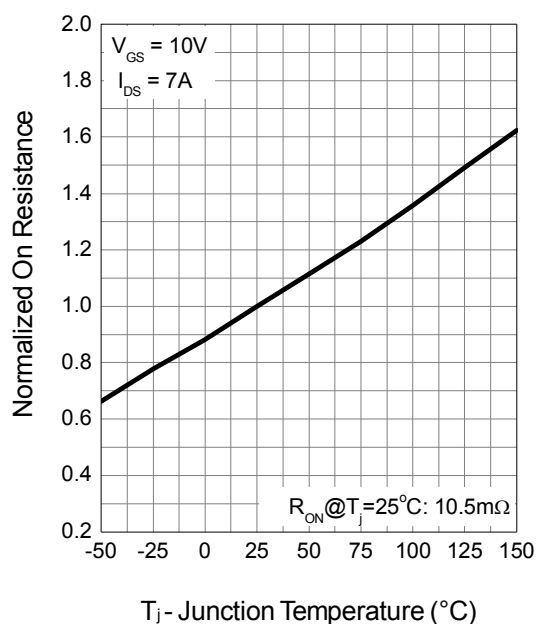


Gate Threshold Voltage

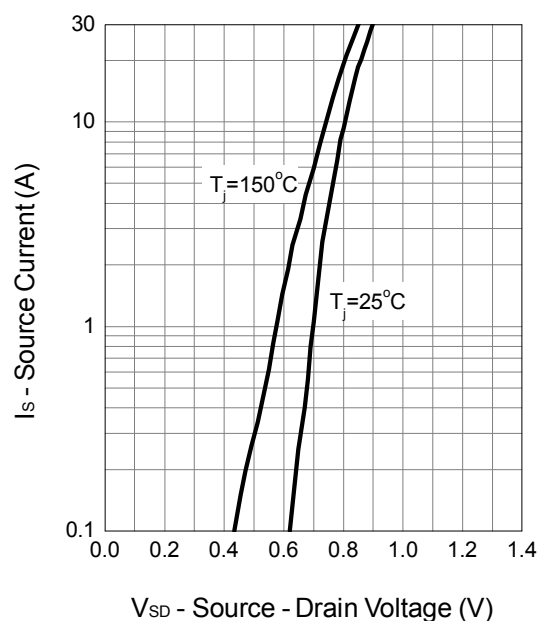


Typical Operating Characteristics (Cont.)

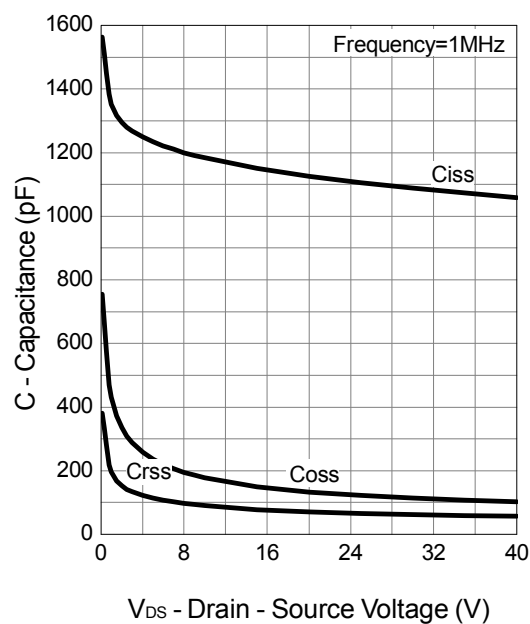
Drain-Source On Resistance



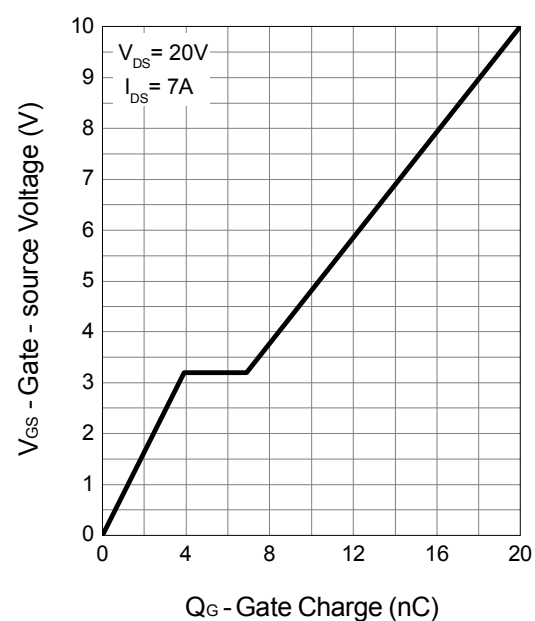
Source-Drain Diode Forward



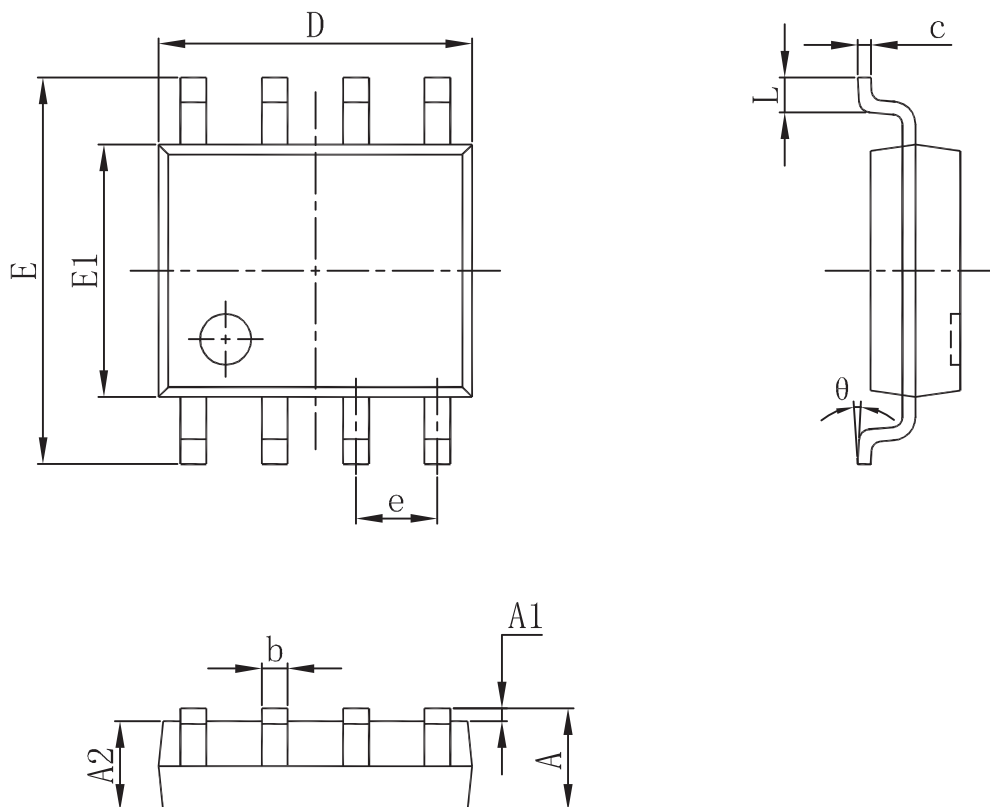
Capacitance



Gate Charge



Packaging information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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